

CLAIMS

1. A pulley unit comprising:

a pulley;

5 a shaft body concentrically disposed in an inner diameter side of said pulley and in a relatively rotatable relationship with said pulley;

a one-way clutch interposed in an annular space between an inner diametrical surface of said pulley and an
10 outer diametrical surface of said shaft body;

a rolling bearing disposed in said annular space on at least axially one side of said one-way clutch; and

seal rings disposed on each of axially one end and axially other end of said annular space for sealing said
15 annular space;

wherein said inner diametrical surface of said pulley forms an outer ring raceway of each of said one-way clutch and said rolling bearing;

said outer diametrical surface of said shaft body
20 forms an inner ring raceway of each of said one-way clutch and said rolling bearing;

said one-way clutch and said rolling bearing each include a plurality of rolling elements interposed between said outer ring raceway and the inner ring raceway in the
25 circumferential direction, and a retainer having a plurality of pockets each accommodating said rolling elements one each;

said retainer of said rolling bearing has an annular portion facing to the side of said seal ring, said annular
30 portion having an outer diameter side which is reduced in diameter so as to increase a storage volume for lubricating oil between said rolling bearing and said seal ring.

2. A pulley unit according to claim 1, wherein said

rolling bearing is a roller bearing comprising a retainer for holding rolling elements, said retainer having an annular portion facing to the side of said seal ring, said annular portion having an outer diameter side which is reduced in diameter.

3. A pulley unit according to claim 1, wherein an inner diametrical surface of said pulley between said one-way clutch and said rolling bearing is provided with a recess which increases said storage volume for the lubricating oil in said annular space.

4. A pulley unit according to claim 1, wherein said rolling bearing is a ball bearing comprising a retainer for holding rolling elements, which has an annular portion facing to the side of said seal ring, said annular portion having an inner diameter side tapered so as to gradually increase in diameter toward its axially outer end.

5. A pulley unit according to claim 4, wherein in said retainer of said ball bearing, said annular portion facing to the side of the seal ring has an outer diameter side tapered so as to gradually decrease in diameter toward its axially outer end.

6. A pulley unit according to claim 1, wherein at least one of said rolling elements of said rolling bearing is made of resin including lubricating oil.

7. A pulley unit according to claim 3, further comprising a lubricating oil-impregnating body which is accommodated and held in said recess.

8. A pulley unit comprising:

a pulley;

a shaft body concentrically disposed in an inner diameter side of said pulley and in a relatively rotatable relationship with said pulley;

5 a one-way clutch interposed in an annular space between an inner diametrical surface of said pulley and an outer diametrical surface of said shaft body;

a rolling bearing disposed in said annular space on at least axially one side of the one-way clutch and
10 comprising a retainer for holding rolling elements; and

seal rings disposed on each of axially one end and axially other end of said annular space for sealing said annular space;

wherein said inner diametrical surface of said pulley
15 forms an outer ring raceway of each of said one-way clutch and said rolling bearing;

said outer diametrical surface of said shaft body forms an inner ring raceway of each of said one-way clutch and said rolling bearing;

20 said one-way clutch and said rolling bearing each include a plurality of rolling elements interposed between said outer ring raceway and said inner ring raceway in the circumferential direction, and include a retainer having a plurality of pockets each accommodating said rolling
25 elements one each; and

a recess for increasing a storage volume for lubricating oil in said annular space is provided in an inner diametrical surface of said pulley between said one-way clutch and said rolling bearing.

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9. A pulley unit according to claim 8, wherein at least one of said rolling elements of said rolling bearing is made of resin including lubricating oil.

10. A pulley unit according to claim 8, further comprising a lubricating oil impregnating body which is accommodated and held in said recess.

5 11. A pulley unit comprising:

a pulley;

a shaft body concentrically disposed in an inner diameter side of said pulley and in a relatively rotatable relationship with said pulley;

10 a one-way clutch interposed in an annular space between an inner diametrical surface of said pulley and an outer diametrical surface of said shaft body;

rolling bearings disposed in said annular space on opposite sides of said one-way clutch; and

15 seal rings disposed on each of axially one end and axially other end of said annular space for sealing said annular space;

wherein said inner diametrical surface of said pulley forms an outer ring raceway of each of said one-way clutch and said rolling bearings;

20 said outer diametrical surface of said shaft body forms an inner ring raceway of each of said one-way clutch and said rolling bearings;

25 said one-way clutch and rolling bearings include a plurality of rolling elements interposed between said outer ring raceway and said inner ring raceway in the circumferential direction, and include a retainer having a plurality of pockets each accommodating said rolling elements one each;

30 said retainers of said rolling bearings each has an annular portion facing to the side of said seal ring, said annular portion having an outer diameter side reduced in diameter so as to increase a storage volume for lubricating oil between said seal ring opposing in an axial direction.

12. A pulley unit according to claim 11, wherein one of
said rolling bearings is a roller bearing, said roller
bearing having a retainer for holding rolling elements,
5 said retainer of said roller bearing comprising an annular
portion facing to the seal ring, said annular portion
having an outer diameter side reduced in diameter.

13. A pulley unit according to claim 11, wherein an inner
10 diametrical surface of said pulley between said one-way
clutch and at least one of said rolling bearings is
provided with a recess which increases a storage volume of
lubricating oil in said annular space.

14. A pulley unit according to claim 11, wherein the
15 other of said rolling bearings is a ball bearing comprising
a retainer for holding rolling elements, said retainer
including an annular portion facing to the side of said
seal ring, said annular portion having an inner diameter
20 side tapered so as to gradually increase in diameter toward
its axially outer end.

15. A pulley unit according to claim 14, wherein said
annular portion of said retainer of said ball bearing has
25 an outer diameter side tapered so as to gradually decrease
in diameter toward its axially outer end.

16. A pulley unit according to claim 13, further
comprising a lubricating oil impregnating body which is
30 accommodated and held in said recess.

17. A pulley unit comprising:
a pulley;
a shaft body concentrically disposed in an inner

diameter side of said pulley and in a relatively rotatable relationship with said pulley;

a one-way clutch interposed in an annular space between an inner diametrical surface of said pulley and an outer diametrical surface of said shaft body;

a ball bearing provided on axially one side of the one-way clutch in said annular space;

a roller bearing provided on axially other side of the one-way clutch in said annular space;

seal rings disposed on each of axially one end and axially other end of said annular space for sealing said annular space;

wherein an inner diametrical surface of said pulley forms an outer ring raceway of each of said one-way clutch, the ball bearing and the roller bearing;

an outer diametrical surface of said shaft body forms an inner ring raceway of each of said one-way clutch, said ball bearing and said roller bearing;

said one-way clutch, said ball bearing and said roller bearing each include a plurality of rolling elements interposed between said outer ring raceway and said inner ring raceway in the circumferential direction, and include a retainer having a plurality of pockets each accommodating said rolling elements one each;

said retainers of said ball bearing and said roller bearing each have an annular portion facing to the side of said seal ring, said annular portion having an outer diameter side reduced in diameter so as to increase a storage volume for lubricating oil between said seal rings opposed to each other in their axial direction.

18. A pulley unit according to claim 17, wherein an inner diametrical surface of said pulley between said one-way clutch and the ball bearing is provided with a recess which

increases the storage volume of the lubricating oil in said annular space.

5 19. A pulley unit according to claim 18, further comprising a lubricating oil-impregnating body which is accommodated and held in said recess.

10 20. A pulley unit according to claim 17, wherein said annular portion of said retainer of said ball bearing has an inner diameter side tapered so as to gradually increase in diameter toward its axially outer end and an outer diameter side tapered so as to gradually decrease in diameter toward its axially outer end.

15 21. A pulley unit according to claim 17, wherein the outer diametrical surface of said shaft body includes an axially one region where said ball bearing is disposed, an axially intermediate region where said one-way clutch is disposed, and an axially other region where said roller
20 bearing is disposed, each of said regions forms the inner ring raceway of each of the one-way clutch, the ball bearing and the roller bearing, an outer diameter of said axially one region where said ball bearing is disposed, is larger than an outer diameter of said axially other region
25 where said roller bearing is disposed.